

HIGH TRANSMITTANCE ALUMINA FOR CERAMIC METAL HALIDE LAMPS

ABSTRACT OF THE DISCLOSURE

5 A high transmittance polycrystalline alumina arc tube for a metal halide discharge lamp is formed by treating an alumina arc tube material having a few percent of closed porosity in a two step process, which provides a high-transmittance arc tube. An initially porous arc tube is formed by extruding or die pressing individual components of the tube from a mixture which includes powdered alumina, assembling the components into an arc tube body, and then partially sintering the components to seal them together.

10 The two step process includes hot isostatic pressing of the partially sintered arc tube and then chemically polishing the surface of the tube. The first, pressing step involves heating the alumina arc tube in an inert atmosphere, such as argon, at a temperature of 1600 to 1900°C and a pressure of about 700 to 2100 kg/sq.cm. for from about one to three hours. This reduces porosity in the crystalline structure. In the second step, the surface of the tube is immersed in a flux comprising a molten alkali metal borate at
15 moderately elevated temperatures, or coated with a flux material which is heated to form the flux, to remove surface imperfections. The finished arc tube has transmittance values which approach those of single crystal sapphire arc tubes.